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AN ELEMENT OF THE GENERAL PLAN OF THE CITY OF  
SANTA CRUZ, CALIFORNIA

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# noise

AN ELEMENT OF THE GENERAL PLAN OF THE CITY OF  
SANTA CRUZ, CALIFORNIA

PREPARED BY THE CITY PLANNING DEPT.  
— JULY 1976

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RESOLUTION CPC-76-22

A RESOLUTION OF THE CITY PLANNING COMMISSION OF THE CITY OF  
SANTA CRUZ AMENDING THE GENERAL PLAN FOR THE FUTURE DEVELOP-  
MENT OF SANTA CRUZ TO INCLUDE THE NOISE ELEMENT.

WHEREAS, the Planning Commission carefully reviewed and evaluated the draft Noise Element which addresses itself to noise, sources and noise control in the City of Santa Cruz; and

WHEREAS, the Planning Commission considered evidence presented thereon, and did find and determine that said amendment to the General Plan for the future development of the City of Santa Cruz does constitute a proper amendment to said General Plan, and meets the requirements of State law; and

WHEREAS, the Planning Commission did hold a public hearing on said document, as required by law, on June 24, 1976, at which time all members of the community were afforded the opportunity to comment on and question the proposed policies; and

WHEREAS, the Planning Commission considered the environmental impacts of the policies contained within the Noise Element and determined that said policies will not have a significant environmental effect, and a negative declaration is the appropriate California Environmental Quality Act environmental determination.

NOW, THEREFORE, BE IT RESOLVED by the City Planning Commission of the City of Santa Cruz as follows:

1. That the City Planning Commission of the City of Santa Cruz does hereby recommend to the City Council of the City of Santa Cruz, the adoption of the Element as a proper amendment to the General Plan for the future development of the City of Santa Cruz, a copy of which is on file in the office of the City Clerk.
2. That the City Planning Commission of the City of Santa Cruz does hereby urge the City Council to take steps to see to it that law enforcement of an appropriate noise control ordinance is pursued.

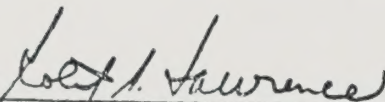
PASSED AND ADOPTED, this 24th day of June, 1976, by the following vote:

AYES: Commissioners - Bowden, Darrow, Seivertson, Shaffer, Chairman Thompson

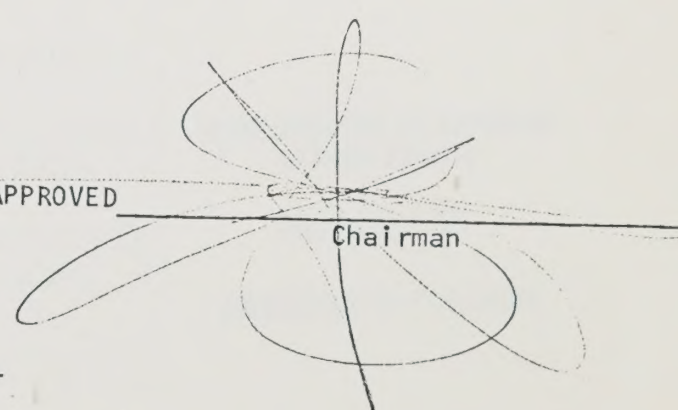
NOES: Commissioners - None

ABSENT: Commissioners - DeWitt, Leonard

ATTEST

  
Secretary

APPROVED

  
Chairman

RESOLUTION NO. NS-12,075

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CRUZ AMENDING THE GENERAL PLAN BY ADOPTING A NOISE ELEMENT.

WHEREAS, by Resolution No. NS 7489, adopted on April 28, 1964, the City Council did adopt a General Plan for the City of Santa Cruz; and

WHEREAS, the State of California Planning Law provides for a Noise Element to the General Plan; and

WHEREAS, the Noise Element is mandated by State Law; and

WHEREAS, the Santa Cruz City Planning Commission has reviewed the Noise Element as a proposed amendment to the General Plan; and

WHEREAS, after careful study, the Planning Commission approved and certified to the City Council said Noise Element as an amendment to the General Plan; and

WHEREAS, the City Council considered all of the recommendations of the Planning Commission, and the evidence presented to the Council at its hearing thereon, and now finds and determines that the Noise Element as recommended by Planning Commission Resolution CPC-76-22, attached hereto and incorporated herein as Exhibit "A", constitutes a suitable amendment to the General Plan for the future development of the City of Santa Cruz;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Santa Cruz as follows:

1. That the General Plan for the City of Santa Cruz as heretofore adopted by the City Council on April 28, 1964 by Resolution No. NS 7498, and as said General Plan has been amended, is hereby amended and there is hereby adopted as said amendment, the Noise Element which is attached hereto marked Exhibit "A".

2. The said General Plan and all of the amendments thereof shall be the guide for future capital improvements and physical developments of the City of Santa Cruz, and for the adoption of precise plans, regulations and legislation for the administration of such General Plan.

PASSED AND ADOPTED this 27th day of July, 1976, by the following vote:

AYES: Councilmen - DePalma, Edler, Muhly, Melville, Ghio; Mayor Mahaney

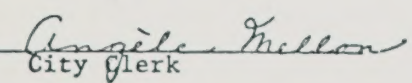
NOES: Councilmen - None

ABSENT: Councilmen - DiGirolamo


APPROVED

  
MAYOR

Attest

  
City Clerk





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# THE SCIENCE OF SOUND

## THE PROBLEM

Exposure to high levels of sound has become common occurrence in everyday American living. Sound emitted from cars, trucks, motorcycles, and buses in our streets; typewriters, reproduction equipment, and business machines in the office; and tools, appliances, televisions and stereo equipment in the home, often totals a large daily dose of sound exposure for Americans. Burgeoning population, concentrations of people in urban areas, and increasing mechanization of society has produced a total sound increase of one decibel yearly over the past 25 years. Lack of appreciation of noise pollution and public acceptance of noise as a way of life in America has caused the United States to rank as the noisiest country in the world.

Noise pollution is difficult to quantify. Noise, by definition, is unwanted sound. Thus, an insignificant sound of a dripping faucet at night could be a noise disturbance, while a tremendously loud symphony could be an appreciated experience. The disturbing noise from a faucet leak would be harmful to one's general peace of mind, but the symphony could pose a potential health hazard to hearing.

The above, of course, are extreme situations. The average experience, however, is the vast body of urban noise — traffic, shouting, shuffle of feet, machinery, etc. — the things which reach us daily but which we neither appreciate nor rage against.

We are able to prevent the exposure of urban noise from becoming unreasonably disruptive of our activities because we are tolerant. Too, the assault of sound has been gradual and has been accepted as part of the price we pay for "progress". However, our ears receive all sound, and whether or not we consider a sound to be a noise has no bearing on the ear, for the cumulative effect

of sound on people is known to be gradual and permanent loss of hearing with age and exposure. Hearing loss is not caused by aging; rather, it surfaces as a result of our lifetime exposure of harmful sound levels - exposure which eventually catches up with most everyone.

## WHAT IS SOUND?

In principle, sound moves through the air somewhat like waves move in the ocean. Sound waves are alternate rings of compressed, and then rarefied, air moving away from a central source at a constant speed. As each wave encounters an object, it exerts force on the object — first a push then a pull. This is why sound can break glass or vibrate a window screen.

Sound has two significant characteristics: pitch and loudness.

Pitch is the height or depth of a tone or a sound depending on the relative rapidity (or frequency) of the vibrations by which it is produced. In low-pitched sounds, the vibrations are relatively far apart; in high-frequency sounds, they are squeezed closer together.

Pitch often produces annoyance even with low volume; an example being a fingernail scratched over a blackboard.

Loudness more physically affects our ability to hear. Loudness involves the *intensity* of sound waves. In terms of effect, intensity is how hard sound waves hit an object.





*A very loud noise may not be annoying in the context of the sound – a loud party, a stadium crowd.*

Relative loudness may be compared to wave heights in the ocean – the higher the wave or the louder the sound, the greater the impact of force generated.

In the ear, the pressure generated from sound waves combines with the reception characteristics of the ear to produce response in the brain.

Human perception of sound is not entirely based on loudness. Our ears sense intermediate frequencies better than sound at very low or very high frequencies.

## SOUND AND ITS MEASUREMENTS

The range of sounds which the ear can perceive has posed a tremendous problem for adequate expression of comparative loudness.

The deafening roar of a large jet engine and a barely audible whisper are both within the range of human hearing, yet their corresponding sound pressures range from 1,000,000 to 1 on the linear scale.

The use of a linear scale with such a great range makes it extremely difficult to compare different sound levels and still comprehend relative loudness. Therefore, the decibel scale, which is logarithmic, is used.

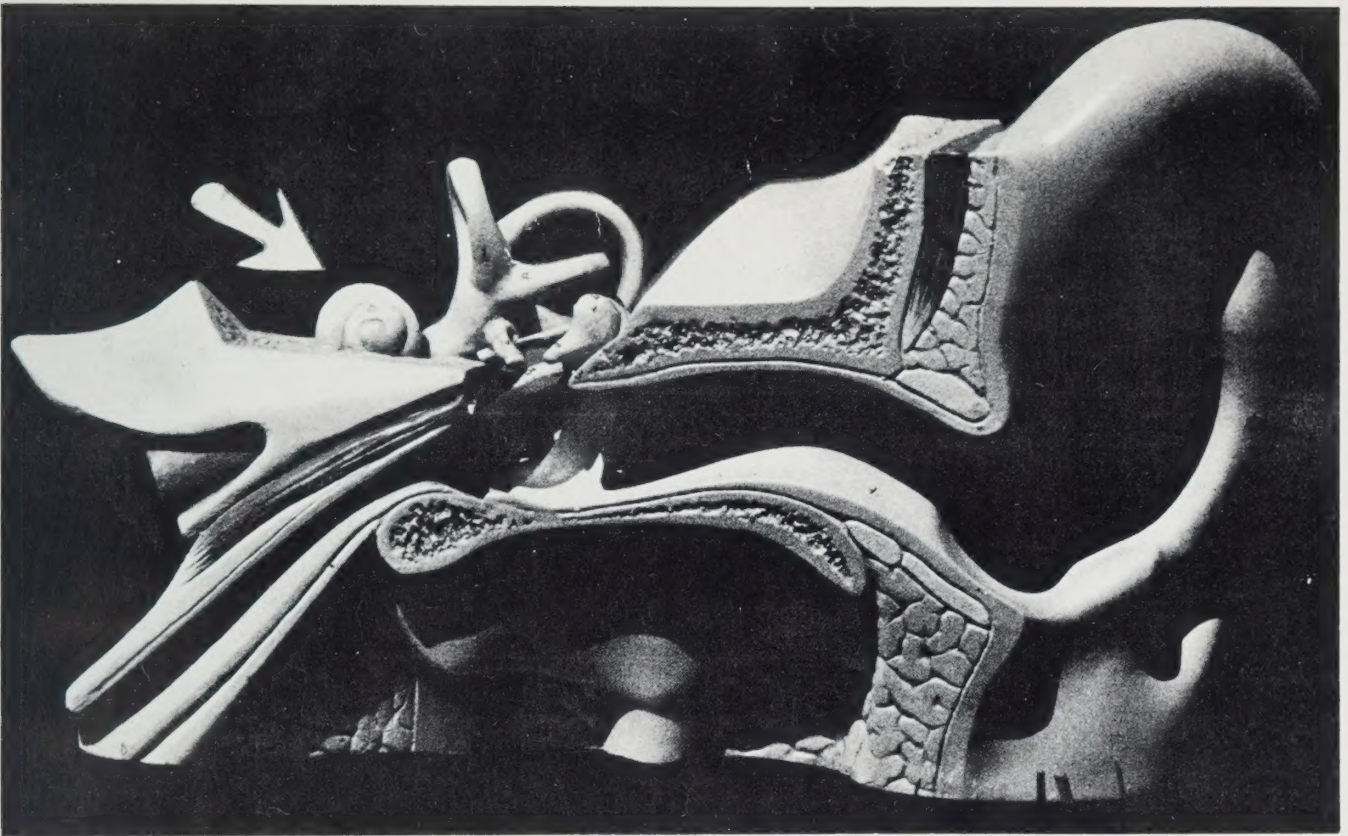
Zero on the decibel scale is based on the lowest sound level that the healthy ear can hear. The numerical values on the decibel scale are representative points on a sharply rising curve which condenses the tremendous range of sound pressure into a meaningful scale. The general rule is that every ten decibels represents approximately a doubling of perceived loudness. A change of five decibels is clearly distinguishable under most conditions and a change of one decibel can be perceived under laboratory conditions.

In relating decibels to human perception, it is necessary to use a particular type of decibel scale. This is known simply as the A-scale, which simulates the response to the human ear – a response more perceptive of mid-range frequencies. The A-scale is universally used for measuring sound levels because of its similarity to human perception.

Sound levels are measured at their source. Decibel ratings decrease as the distance from the source increases.

Normal conversation at 2 feet produces a 60-decibel noise level. A heavy truck produces nearly 90 decibels while moderate traffic runs around 70-75 decibels. The gentle rustle of leaves is rated at 10 decibels and thunder produces 100 decibels. The ear normally begins to feel pain at just above 120 decibels.





*Section through an ear. Intense sound waves can damage the microscopic hair cells in the snail-shaped structure called the cochlea.*

## SOUND AND THE INDIVIDUAL

The human response to sound is as varied as human nature itself. Individual tolerances hinge on a number of factors: general health, age, mental and emotional status, occupational tolerance, and individual physiology. In certain circumstances, a very loud noise may not be annoying in that the context of the sound (i.e., a loud party, the roar of the surf, amplified music, or a stadium crowd) is something that the individual expects and enjoys. On the other hand, a much softer noise which interrupts concentration, sleep or enjoyment of peace and quiet will certainly be more annoying.

In general, the level of an intruding sound which will cause disturbance depends upon its relation to the level of the other background sounds or ambient level, and the condition of the listener.

The subjectivity of reactions to sounds makes it hard to publically control noise. In determining permissible standards consideration must be made for the fact that some individuals are tolerant of high levels of noise and can function adequately, while others are especially sensitive and can be disturbed by noise of a much lower level.

## SOUND AND THE EAR

The ear automatically shields itself from damaging sound levels through what is termed the "acoustic reflex".

Three tiny bones, called ossicles, receive the vibrations of sound waves transmitted by the eardrum. The ossicles then change the loudness of the sound before it enters the inner ear.

Normal action of the ossicles may amplify soft sounds as their tiny muscles contract to decrease the pressure of the sound waves.

Thus, the acoustic reflex protects the inner ear from extra loud sounds by reducing them, just as the eye protects itself from extra bright light by contracting the pupil.

The acoustic reflex, however, is limited in effectiveness by two factors.

First, there is a time lag of a few hundredths of a second between the time sound is first sensed and the



**Sound Levels and Loudness of Illustrative Noises in Indoor and Outdoor Environments**  
(A-Scale Weighted Sound Levels)

dB(A)	OVER-ALL LEVEL (Sound Pressure Level Approx. 0.0002 Microbar)	COMMUNITY (Outdoor)	HOME OR INDUSTRY (Indoor)	LOUDNESS (Human Judgment of Different Sound Levels)
130		Military Jet Aircraft Take-Off With After-Burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120dB(A) 32 Times as Loud
120	UNCOMFORTABLY	Turbo-Fan Aircraft @ Take-Off Power @ 200 Ft. (118)	Riveting Machine (110) Rock-N-Roll Band (108-114)	110dB(A) 16 Times As Loud
110		Jet Flyover @ 1000 Ft. (103) Boeing 707, DC-8 @ 6080 Ft. Before Landing (106) Bell J-2A Helicopter @ 100 Ft. (100)		100dB(A) 8 Times As Loud
100	VERY	Power Mower (96) Boeing 737, DC-9 @ 6080 Ft. Before Landing (97) Motorcycle @ 25 Ft. (90)	Newspaper Press (97)	90dB(A) 4 Times As Loud
90	LOUD	Car Wash @ 20 Ft. (89) Prop Plane Flyover @ 1000 Ft. (88) Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80dB(A) 2 Times As Loud
80		High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. from Pavement Edge, 10 AM (76 ± 6)	Living Room Music (76) TV-Audio, Vacuum Cleaner (70)	70 dB(A)
70	MODERATELY LOUD	Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Elec. Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60dB(A) ½ As Loud
60		Large Transformers @ 100 Ft. (50)		50dB(A) ¼ as Loud
50	QUIET	Bird Calls (44) Lower Limit, Urban Ambient Sound (40)		40dB(A) 1/3 As Loud
40		[dB(A) Scale Interrupted]		
10	JUST AUDIBLE			
0	THRESHOLD OF HEARING			

Source: *Melville C. Branch, et al., Outdoor Noise and the Metropolitan Environment, (Los Angeles Department of City Planning, 1970), P. 2.*

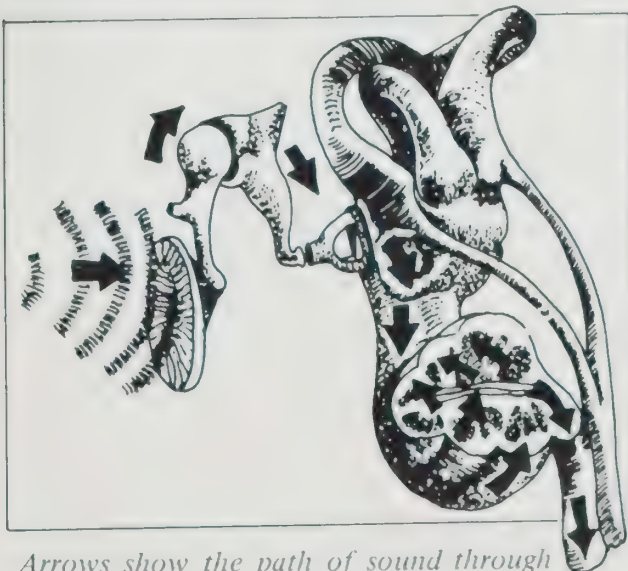




*Noise induced permanent hearing loss cannot be restored either through surgical procedure or with hearing aids.*

time the ossicle muscles contract in reaction. Some of the sound at full loudness gets through to the delicate inner ear at this time.

Secondly, the muscles cannot contract indefinitely, so their sound dampening capacity is limited. If the loud sound is sustained, the inner ear may still be bombarded with excessive sound pressure even if the reflex has a chance to work. In the case of impulse sounds such as a gunshot, the reflex is virtually useless as a defense.



*Arrows show the path of sound through the inner ear.*

What happens when loud sounds enter the inner ear?

The ossicles transmit the vibrations to a fluid contained in a tiny, snail-shaped structure called the cochlea. Within the cochlea are microscopic hair cells that move back and forth in response to the sound waves just as kelp on the ocean floor undulates in response to wave action in the ocean. It is the energy impulses created by the movement of these crucial hair cells that go to the brain where they are interpreted as sound. Intense sound waves can damage these hair cells just as a violent wave action can tear and rip seaweed.

### THE EFFECTS OF LOUDNESS: HEARING LOSS

Short-term exposure of high decibel levels may produce a temporary hearing impairment — partially as a result of the acoustic reflex of the ear. Hearing loss is measured in terms of the threshold level, or the level of a tone that can just be detected. Exposure to loud sounds raises the threshold level temporarily as the acoustic reflex works to dampen the effect of the noise. This hearing loss, when temporary, is called a temporary threshold shift and will gradually diminish when the

exposure ceases and the ear returns to normal capacity. Recovery time varies with the length and intensity of, the exposure and the unique physiological characteristics of the individual. Sometimes it is a matter of minutes or a few hours, in other more severe cases, the ear may recover only after weeks or months.

When the threshold shift is a mixture of temporary and permanent aspects, it is a compound threshold shift. When the temporary aspects of a compound threshold shift have disappeared (when the ear has recovered or as much as it ever will), the remaining hearing loss is permanent and will persist for life.

In general, sound levels must exceed 60-80 decibels before a typical person will experience temporary threshold shifts, even for exposures lasting 8-16 hours.

Longer exposures and higher sound levels increase the magnitude of the threshold shift and the threat of permanent hearing damage. Too, continuous noise is more damaging than oft-interrupted exposures.

Hearing loss generally occurs first in the high frequency ranges as the hair cells that respond to higher frequencies seem most susceptible to damage. Noise-induced permanent hearing loss cannot be restored either through surgical procedures or with hearing aids. Potential hearing loss with sustained exposure occurs when noise exceeds 90 decibels. Daily exposure to 75 decibels (common in urban and suburban areas) will wear down our hearing with age.

## NOISE AND THE BODY

Physiological reactions to noise begin when sustained noise levels reach 80-85 decibels. Even moderate volume and short durations of noise may produce a number of physical changes. Blood vessels in the brain may dilate while other body blood vessels may constrict. Changes in heart rhythm, blood pressure, gastronomical and cholesterol secretions, and pupillary dilation have been observed. However, most of these changes are temporary, and no definite permanent effects on the circulatory system have been found. No clear evidence exists to indicate that the continued activation of these responses leads to irreversible changes or to permanent health problems.

## STRESS

Many of the physiological reactions to noise are carry-overs from primitive times when most loud sounds indicated possible danger and the body adjusted to meet any threats. Today, we are continually confronted with

a wide spectrum of sounds in daily living. Even though these reactions may occur many times each day, we may not be immediately aware of these stress changes since they are functions of the involuntary or automatic nervous systems. Again, the effect of exposures is unique for each individual. Nonetheless, scientists are beginning to view noise as a possible contribution to the modern catch-all affliction known as stress.

Ulcers, indigestion, fatigue, irritability, stomach problems, heart disease, all are connected to stress in general. Since noise is interpreted by the body as stress, it may be a contributing factor in the rate of occurrence of these disease conditions, although no firm relationship can now be established.

## NOISE, EFFICIENCY AND MONEY

Noise studies show that while noise does not usually influence the overall rate of work, it does tend to increase the variability of the work rate and often reduces work quality or accuracy. Work disruption depends on other factors such as the type of work, the physical state of the worker, and the degree of motivation, morale, and general mental health.

Monetarily, in the United States, the total cost to industry in compensation payments, lost production, and decreased efficiency due to noise is an estimated 4 billion dollars, according to the Environmental Education and Environmental Alert Groups. The World Health Organization estimates that office noise in the United States causes a loss of 4 million dollars daily, due to work disruption.

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*Sources: "Effects of Noise on People", USEPA, 1971; "Information on Levels of Environmental Noise Requisite to Protect Public Health & Welfare", USEPA, March, 1974, Report to the 1971 Legislature on the Subject of Noise: Human Relations Agency, Dept. of Public Health; Oxnard-2000: General Plan, Noise Element, Phase I, Sept., 1973; "Noise Pollution", USEPA Booklet, August, 1972; Public Interest Re-Report: "Noise Pollution and Solutions for Silencing the Problem", Env. Education Group, Env. Alert Group, 1973; "Regulation of Noise in Urban Areas", Wm. Gately, Edwin Frye, Univ. of Missouri, 1971.*



# LEGISLATIVE CONCERN AND ACTION

## THE PROBLEM

There is usually a time lag between public recognition and definition of a problem and actual legislative action to remedy the problem. The area of noise provides a classic example.

Until recently, noise concern centered primarily in industrial situations where the problem has been much greater. However, public concern for noise in general has been on the upswing in the last decade, primarily due to two factors — increasing urbanization in society, and the burgeoning of environmental awareness.

Today, in response to mounting public concern, legislation promoting noise abatement is appearing at all levels of government — federal, state, regional, and local. At present, legislative advocacy and regulation is expanding beyond the confines of industrial protection because dramatic advances in research have shown that noise pollution affects everyone, especially urban dwellers, and may be more harmful to public health and welfare than even air pollution.

A difficulty with governmental involvement with noise is the nature of the noise problem itself.

Personal reaction to noise is entirely subjective, and steps to control it can be pursued in a number of ways:

- 1) controlling noise at the source;
- 2) affecting the pathway of sound waves with barriers or increased distance;
- 3) controlling the transmission of noise through structures;
- 4) enclosing or protecting the receiver of noise.

Diesel truck noise exemplifies the jurisdictional dilemmas of government response to noise problems. Should the noise be controlled by local nuisance regula-

tions, by the State Motor Vehicles Code provisions, by the Federal equipment specifications, or by all three? Should sound be reduced by barriers constructed in the public right-of-way at State expense, or at the expense of the developer on private property in accordance with local zoning controls? And, in areas of light truck noise impact, should the local building code provisions be selectively more stringent than the Uniform Building Code?

Also, what constitutes an acceptable noise level for a majority of the populace and how can this be determined? The individual reaction to noise is so subjective that a terrible annoyance to one person may be unnoticed by his neighbor. Legally, at what point does equal protection guarantee the right to produce sound as a personal expression over the public right to preserve quiet?

Despite the above and other pertinent questions, the legislative pace is quickening. At the Federal level, authority was given to the Federal Aviation Agency to establish limits on aircraft noise in the Aircraft Noise Abatement Act of 1968. The Walsh-Healy Public Contracts Act requires protection of factory workers involved with government contract projects. The Noise Control Act of 1972 mandates responsibility to the Environmental Protection Agency to research and publish information regarding levels of noise and to develop standards for controlling identified noise sources.

In 1964, State hearings took place in anticipation of other legislation which could establish construction guidelines and design specifications for housing and noise emitting equipment.

California's involvement in noise abatement dates back to 1957, when the legislature first required every registered vehicle to be equipped with a muffler system. Between 1953 and 1967, numerous laws placing noise ceilings on exhaust emissions were authorized — most of which subsequently died in committee. In 1967, noise emission limits for motor vehicles were first passed by law. These were revised slightly in 1969, 1970, and 1971. During these years also, a number of other noise regulating bills were introduced and killed, including a 1971 statute regulating snowmobile noise which was vetoed by former governor Ronald Reagan. Currently, noise emissions from motor vehicles are limited by a State statute (AB 1044), which includes a timetable requiring a reduction to the established tolerable limits in new vehicles from 88 decibels in 1972, to 70 decibels after 1988. (See table below):

1971 Schedule of New Vehicle Noise Limits			
Effective Date	Noise Limit — dB(A) at 50 Feet		
January 1	Trucks & Buses	Motorcycles	Passenger Cars
1972	88	88	86
1973	86	86	84
1975	83	80	80
1978	80	75	75
1988	70	70	70

In addition to motor vehicle provisions, the State also engages in noise research projects such as noise barrier costs and effectiveness, truck noise attenuation, and freeway noise reduction projects.

Local reckoning with noise problems is guaranteed by State legislation which requires California cities and counties to include Noise Element as one of the nine elements of the General Plan (Gov. Code 65302(g)). Essentially, the State requires that the Element summarize existing noise sources and levels in quantitative and numerical terms and develop policies, goals, and guidelines indicating the city's intentions regarding noise and noise sources within the community. This includes noise monitoring, and identification of problem noise areas.

At the local level, most cities have municipal code provisions dealing with noise as a nuisance. Frequently, these code ordinances are out of date in terms of current understanding and technology of noise (its measurements and the various abatement possibilities), so at present many municipalities in California are revising or creating new noise ordinances based on current information and new policy developed in the Noise Element. Since the science of noise in society is relatively recent and changing, it is important that local jurisdictions constantly update their approaches to, and provisions for, noise and its abatement.



*California's involvement in noise abatement dates back to 1957, when the legislature required every registered vehicle to be equipped with a muffler system.*

*Sources: California State Vehicle Code; "Motor Vehicle Noise", Technical Advisory Panel on Motor Vehicle Noise, California Assembly Committee on Transportation, Feb., 1973; State of California Memorandum, Department of Transportation, "Noise Level Information for City & County General Plans", 1973; "Noise Problems in our Cities", League of California Cities.*



# NOISE AND ENFORCEMENT

## ENFORCEMENT PROBLEMS

Consider these actual situations:

I) At a neighborhood planning meeting, the citizens of a residential area complained to the Police Department about traffic—speeders and noise. The traffic control officer present responded that the City Police would be willing to crack down on the traffic problems in the area, but warned that the violators would most likely be the neighborhood residents themselves and their children. The next day, an officer put in an eight-hour shift in the very same neighborhood. He cited seventeen cars for speeding violations. Of the seventeen, fourteen violators were adults. Twelve of those lived in that neighborhood, many of whom had attended the neighborhood meeting. Three were local high school students. Quite predictably, all had reasonable excuses for their speeding. Personal exceptions, when multiplied by the general populace, become the rule.

II) A student, living on the west side of town, near an open field is terribly disturbed by off-road motorcycle noise. The rider has permission from the property owner to use his vacant land for motorcycle riding, and his motorcycle conforms to the California Vehicle Code standards for noise emissions. Motorcycles simply are loud and seem especially so when running in an otherwise quiet neighborhood. In some cases, a noise emission which seems unduly loud by ear, will be legal within the limits of the law.

III) The tourist industry is the noisiest industry in Santa Cruz. Summertime, vacations, and weekend traffic in the Beach Hill-Boardwalk area is heavy and often noisy. Circulation and noise problems are compounded by the geography of the area. For example, traffic traveling up Second Street must stop at Cliff Street before going up the hill. The stop sign offers a fine

opportunity for drag racing up the Second Street hill which is difficult for the police to stop as cars do not exceed the speed limit in taking off from the stop sign. Each summer month, the City Police force issues hundreds of citations for excessive noise, often to people who were cited previously. The noise problem continues in spite of enforcement actions.

IV) A resident calls the police to complain about the neighbor's dog barking. Officers respond to the call; the dog's barking is stopped. Police then offer the complaining resident a chance to sign a formal complaint. The resident declines, fearful of "becoming involved."

## EXISTING CONDITIONS

At present, the Santa Cruz Municipal Code prohibits excessive noises between 10 PM and 8 AM, and any unnecessary noises which "occasion physical discomfort to the inhabitants of any neighborhood." Also, the use of sound amplification equipment without a permit if the use of such equipment causes "unreasonable disturbance" to persons "of normal sensitiveness" is illegal and permits must be secured from the City Manager's Office.

Because the ordinances do not specify actual decibel limits, enforcement can proceed only if a resident is prepared to file a formal complaint. Since such a move could require an appearance in court, some residents are naturally hesitant to sign a formal complaint.



*It is quite likely that noise in our technological society will continue to be a problem.*

## MOTOR VEHICLES

As for motorcycle riding in off-street areas, the law permits dirt riding if the cyclist has written permission from the land owner. Since the muffler requirements for off-street motorcycles are less stringent than for street bikes, the noise factor is less easily attenuated. The problem also is one of jurisdictional overlap, for such a motorcycle may be causing an illegal disturbance to a neighborhood under the Municipal Code, but be perfectly legal under State law. Autos, trucks and motorcycles are regulated by State performance standards.

*Source: Personal interviews with Santa Cruz City Police Department personnel by Santa Cruz City Planning Department personnel.*

## SUMMARY

From the above examples, one can easily see the difficulties of noise enforcement. Sometimes the courts are unable to force correction, or the offender cannot be cited because an officer has not seen or heard the violation, and a citizen is unwilling to stand behind his complaint.

Even with concerted police action, effective noise enforcement will come about only when citizens show personal restraint, civic responsibility, and a willingness to compromise. Many noise complaints can be best handled on a personal level—neighbor-to-neighbor—through individual public relations.



# PROSPECTS FOR ABATEMENT — WHAT CAN BE DONE?

## THE PROBLEM

Since it is quite likely that noise in our technological society will continue to be a problem, health officials are strongly recommending that people protect themselves more effectively from noise, and that they personally create as little noise as possible.

The use of earplugs and ear defenders, as commonly as sunglasses, is one way individuals can preserve their hearing. Also, the use of noise-proof walls in construction and noise-absorbing items in the home—things such as window drapes, carpets, upholstered furniture, and acoustical ceilings—will help absorb sound and reduce reverberation.

In making purchases of tools, appliances, toys, or motor-driven apparatus or machines, buyers should take into consideration the noise levels of the various brands and favor the quieter items.

Personal restraint in the production of noise is perhaps the most important action towards reducing noise in society overall. With increased education about noise and greater public awareness of its danger, people will begin to demand more quiet surroundings at home and on the job. When demand for quiet translates into legislative action, tougher noise reducing standards will help bring about quieter machines, homes, vehicles, and appliances.

The problem with most of the above measures is to make them cost-effective — that is, the cost of attenuating the noise problem must not be so prohibitive as to wipe out the perceived usefulness of the change.

The above problem is compounded by the fact that many noise abatement techniques are not yet proven. For example, recently enacted State insulation laws governing new construction have created a number of



*Personal restraint in the production of noise is perhaps the most important action towards reducing noise in society.*

difficult problems for contractors, designers, and building officials which were unforeseen at the time the legislation was drawn up.

The problem of noise abatement cannot be tackled with legislation alone, but involves private industry and individual citizens.

## QUIETING OF VEHICLES

The following look at some of the problems involved in abating vehicular noise is useful for our understanding of the scope of noise control dilemma. Since by far the greatest source of urban noise is produced by traffic—particularly modified autos, trucks, and general high-speed traffic—this is the area that needs to have the most effective controls enacted. The first priority in any abatement program should be to concentrate on the noisy vehicles — the large diesel trucks, motorcycles, and sports cars and hot rods.

Vehicle noise is produced primarily by the exhaust system, engine, and transmission. At higher speeds, the tire noise becomes the greatest source of vehicle noise with an added sound contribution from complex vibration of the other surfaces of the vehicle. Research is being done regarding the prospects for better engine insulation, muffler assemblies, quieter overall design, and the use of more quiet alloys in body construction.

The diesel truck, which is the major source of noise from freeways, has received the most attention from legislators, the public, and manufacturers alike. Reduction of the noise from trucks, more than anything else,

would result in considerably less noise to community areas that border the highways.

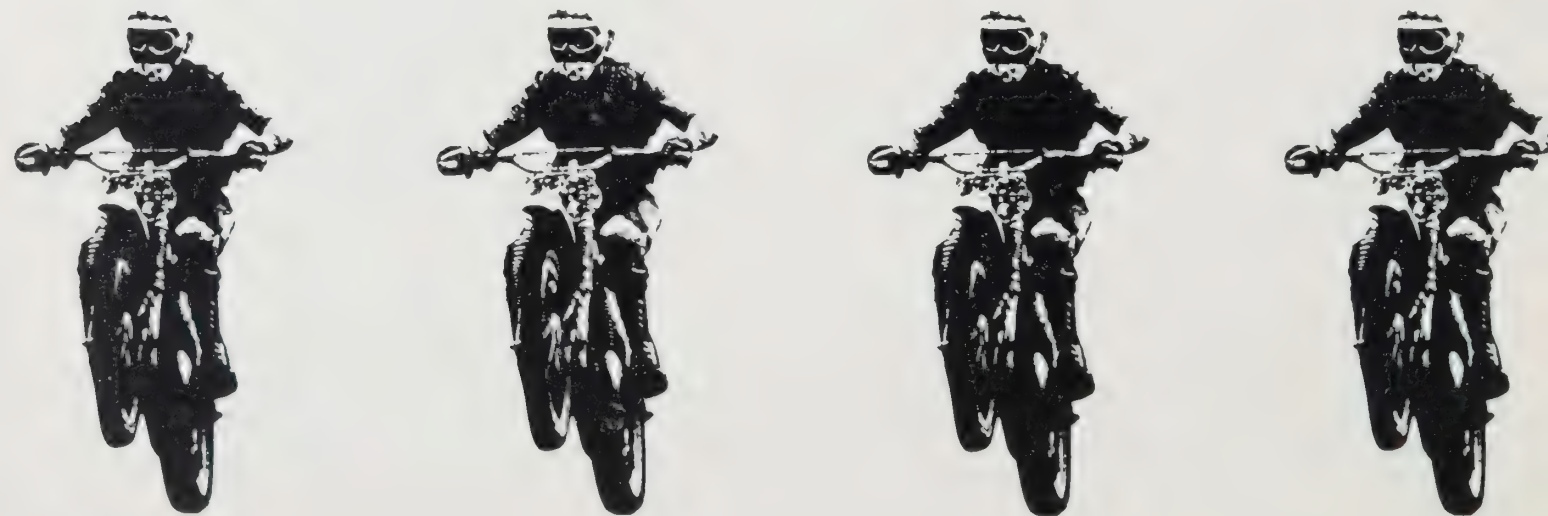
To achieve the 1988 goal of 70 decibels maximum for trucks, it will be necessary to develop practical economic ways of implementing noise reduction techniques. Unfortunately, many proposed techniques are as yet unproven concepts. Additionally, the accompanying reworking of tooling and production promises to be a major task.

A 1971 vehicle survey done by the Highway Patrol showed that 5.4% of trucks, 15.3% of motorcycles, and 7.4% of passenger automobiles exceeded the then existing noise limits for motor vehicles (7,577 vehicles measured). The 1971 limits were approximately 20% less stringent than the current 1975 standards, so it is not unreasonable to assume that higher percentages of non-conforming cars would be in violation today. A 1972 Ford Motor Company report states that noise emissions would have to be reduced 60% by 1988 (from 1972 levels) to comply with noise goals. Compliance will necessitate redesign of engine enclosures and noise shields, cooling systems, exhaust systems, air intake systems, transmissions, various engine accessories, and tires.

Tests show that design modifications in highways—the use of barriers, screens, berm embankments, elevations, or depressed freeways—can reduce traffic noise in adjacent areas by as much as ten decibels, or to a level that is roughly half as loud to the average person.

## NOISE CONTROL PROGRAMS

A number of California cities are establishing noise





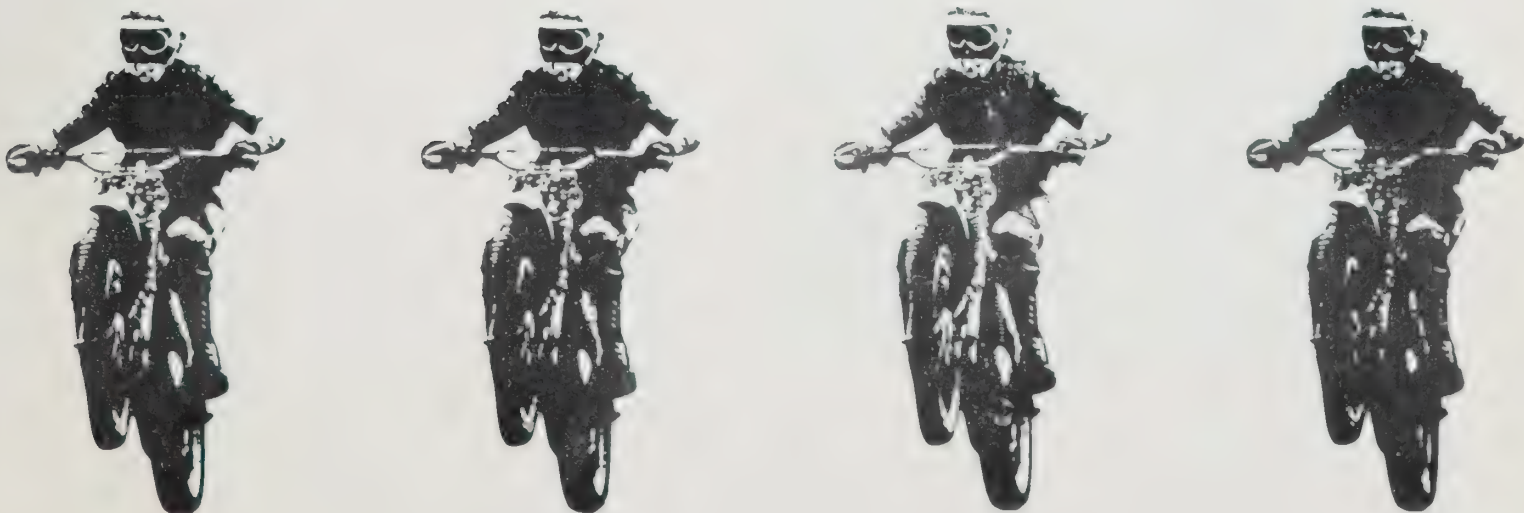
Section____. Ambient Base Noise Level				
Where the ambient noise level is less than designated in this section the respective noise level in this section shall govern.				
<u>Sound Level A, decibels</u>				
Community Environment Classification				
Zone	Time	Very Quiet (rural, suburban)	Quiet (suburban)	Slightly Noisy (suburban, urban)
R1 and R2	10 pm to 7 am	40	45	50
R1 and R2	7 pm to 10 pm	45	50	55
R1 and R2	7 am to 7 pm	50	55	60
R3 and R4	10 pm to 7 am	45	50	55
R3 and R4	7 am to 10 pm	50	55	60
Commercial	10 pm to 7 am	55 ← 55 → 60 ← 60		
Commercial	7 am to 10 pm	60	65	
M1	anytime	70	70	
Ms	anytime	75	75	(3)

Section\_\_\_\_ Violations: Misdemeanors

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and upon conviction thereof, shall be fined in an amount not exceeding<sup>(4)</sup> Five hundred and no/100ths Dollars (\$500.00) or be imprisoned in the City or County Jail for a period not exceeding six (6) months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

control programs which they hope will provide a more personal and effective response to noise complaints. Generally, these control programs are structured from a very strict noise limitation ordinance that establishes maximum allowable decible limits by land use, and enforce them through a continuous noise monitoring

program which is administered by Police, Public Works or Planning Departments, or through a special environmental noise administrator. Noise monitoring is done continually on a city-wide basis to establish ambient noise patterns and to recognize any increases in ambient levels. Spot checking in response to complaints is also



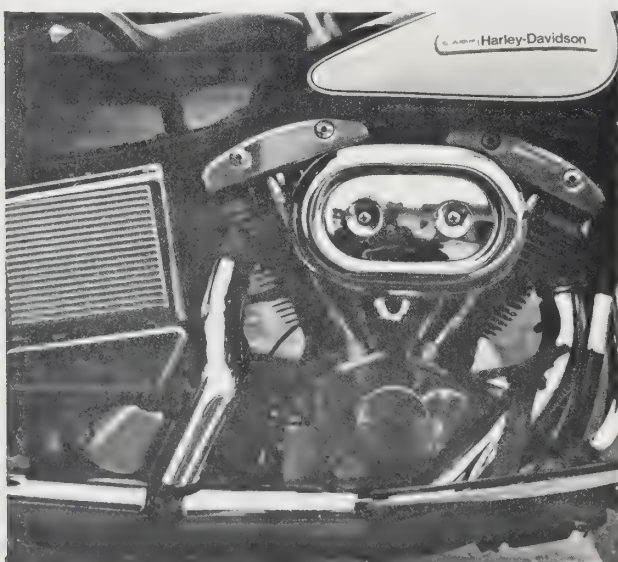
done, and enforcement does not require a formal personal complaint since the ordinance specifies allowable decibel limits. Thus, a noise control officer equipped with a portable sound level meter can issue warnings or citations on the spot, and the offender and complainant can see exactly the extent of the noise offense.

The key to such a program, of course, is the delineation of equitable maximum sound limits, and the equipment and personnel to enforce such limits. In most cases, decibel limits are based on existing ambient levels, and a determination of these levels requires an extensive sound measurement operation. A model noise ordinance, published by the League of California Cities suggests permissible sound levels, but recommends that each city do complete monitoring to establish limits unique to the city's situation.

Whether such a program could be established for Santa Cruz is a question of priority within budget constraints. An improvement in the noise abatement work locally would require equipment purchases, training, and significant appropriation of money and personnel to properly enforce a tougher noise ordinance. Higher taxes or reduction of another service would be the consequence.

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*Sources: "Training Guide & Enforcement Manual," League of California Cities, 1973; "Regulation of Noise in Urban Areas," William Latley and Edwin Frye, University of Missouri, 1971; "Motor Vehicle Noise," Technical Advisory Panel on Motor Vehicle Noise, California Assembly Committee on Transportation, February, 1973; "Model Noise Ordinance," League of California Cities, 1973.*





## NOISE IN SANTA CRUZ

### CITIZENS' PERSPECTIVE

In the Fall 1974, a noise survey was published in the Santa Cruz daily newspaper, giving citizens an opportunity to air their complaints, and give suggestions regarding noise levels and sources throughout the City. Also, a number of noise level readings were made at selected locations monitoring ambient sound and intrusive noises. Although these sample readings do not substitute for a full-scale noise monitoring program, they do give a random sampling which is partially useful in visualizing the City's noise environment.

The response to the noise survey brought into focus the major areas of noise annoyance. By far, traffic generated sounds proved the most irritating among local residents. This problem is especially acute in the Beach Hill-Boardwalk area where tourist traffic circulates in great volume—especially during the summer months and weekends, often late at night. The problem here also is intensified by the steepness of Beach Hill which necessitates low-gear, high-engine strain, and noise from vehicles.

Motorcycles were frequently mentioned as noise irritants, usually in neighborhoods with expanses of vacant lands popularly used by off-street motorcycles.

The third major source of complaints was animal noise—usually barking dogs. This problem is less easily confronted, and appears to fall more under the jurisdiction of animal control.

Of 405 respondents City-wide, 370 answered “yes” to the question, “Do you believe noise to be a significant problem in the City of Santa Cruz?”. In addition, a vast majority of these respondents indicated that noise pollution was a greater problem locally than air, water, visual, or litter pollution.

The survey results are included in each Analysis Area summary.

In making random samplings of sound levels, the emphasis was placed on obtaining a number of readings which quite possibly are experienced by many Santa Cruz citizens. Measurements were taken at schools, in neighborhoods, downtown on the Mall, at a bus stop, in the library, and also at locations of specific intruding noises such as the Southern Pacific freight train as it passes through town. The results should be fairly accurate, although some margin of error must be allowed.

A private ear investigation of Santa Cruz confirmed a common principle of sound assessment: Loudness is not necessarily noise, but an unwanted sound most always is. For example, in our quiet library (ambient near 40 decibels (A)) an intensive sound of only 45 decibels or greater arises as an environmental annoyance while just down the street at the Cooperhouse, scores of folks listen to and enjoy the outdoor music which registers 82 decibels.

On a wet winter day, 84 decibels from an approaching Santa Cruz Transit bus signals welcomed relief and no annoyance to a smattering of chilled and soaked city travellers. A short time later, perhaps, our same bus rider will become annoyed at a neighbor's dog, who's barking disrupts a quiet neighborhood but only produces 60-65 decibels of sound. The same dog's eager barking may be warming to the owner's children or comforting to a lonely person.

Private ears are inextricably allied with our brains and hearts. They speak for the boss, so to speak, who



*Our individual sound producing efforts are all cooperative producers of the City's sound character.*

sorts sound annoyance by personal preference and prejudice and not by decibels. Noise is a convenient vehicle to register aggravation, for one's toleration level is totally personal and requires no more justification than the subjective invective: "Stop that damn racket!" The family child-minder will attest to the clarity and finality of a well-timed no-questions-no-exceptions cease and desist command for our noise-producing offspring. The child knows that he is no louder than yesterday or tomorrow—it's just that today's standards are significantly lower.

Quite simply, our brain in its omnipotence often does little to protect its precious audio receptors. Our ears do not have sufficient intestinal fortitude or physical dominance to buck the top-level decisions upon which we base our sound exposure policy. The ear never says no, but it will say die, and gradually, daily, we all grow less accurate of hearing. Whether from symphonic music or noisy motorcycles, 90 decibels are 90 decibels. Whether we enjoy or rant, a sound is taking its slow, subtle, and inevitable toll upon our hearing, cumulatively wearing thin with age the durability and resistance of our loyal servants—our ears. Metaphysically speaking, I do not know what you hear, but the common sounds among us all are always there, with varying degrees of annoyance, standing as a constant comment upon the environment we share.

Perhaps, of all things that comprise our community, the environmental sound level is that which is most truly

held in common. Our individual sound producing efforts—whether in conversation, driving, construction or special effects—are all cooperative producers of the city's sound character.

The following are a few of the noise experiences available to Santa Cruz residents:

## THE MALL

The Pacific Garden Mall is the most walked about place in town. It is also a major part of the present traffic circulation system and, therefore, guarantees a certain number of buses, autos, and delivery vehicles. Most of the vehicles driving through Pacific Avenue travel at low speed which tends to curtail the total amount of noise emissions. However, the sheer volume of pedestrian and bicycle traffic means that many people will be receivers of any and all vehicular phonics.

A typical weekday afternoon noise level on Pacific Avenue is 62-64 decibels. Occasional sports cars will produce up to 75-80 decibels. A shout here and there, and the inevitable Transit buses round out the intrusive noise environment.





*In times long since past, sitting on the main town corner was an accepted pastime – peaceful and uneventful.*

Outdoor music is also a trademark of the downtown Mall. While a few respondents to the City's Noise Survey expressed displeasure with amplified music in their shopping day, a majority of Santa Cruzans seem to relish the festive, jazzy air surrounding musicians. This is a classic case in point about noise: The sound level from the outdoor music ranges near 82-85 decibels (82 at 25'), but since many people do not classify this amplified music as noise, the annoyance factor is usually low.

## THE OFFICE

For the many that work in an office, noise blocking from mental consciousness and activity is a key talent. The clacking of typewriters, the groaning duplicating machine, phones ringing, and sometimes overcrowded conditions, make noise an irrepressible factor of the work environment.

Interrupted concentration and general office noise often renders 5 PM as the long-awaited time for some peace and quiet. A very busy office often registers a constant 65-70 decibels. The exposure for a typist at a large electric typewriter doing some fast typing is around

74 decibels. Even the dial tone in the phone registers from 60 to 90 decibels, depending upon its proximity to your ear.

## BUSY CORNERS

In times long since past, sitting on the main town corner was an accepted pastime—peaceful and uneventful. Today, a busy intersection provides little respite for the weary, and is more often than not an invitation for aggravation through noise annoyance.

For example, at Mission and Bay, a conversation between the City's noise surveyor and a pedestrian went something like this:

*Pedestrian: What's that you're doing?*

Noise Monitor: What?

*Pedestrian: What's that you're doing?*

Noise Monitor: Taking noise-level readings.

*Pedestrian: What?*

Noise Monitor: This is a sound-level meter. It's used to measure the noise here, in decibels.

*Pedestrian: In what?*

Noise Monitor: In decibels.

*Pedestrian: That's terrible.*

Noise Monitor: What's terrible?

*Pedestrian: The noise.*

Noise Monitor: The what? . . . Oh, yes, the noise.

Mission and Bay is a special case. The main throughway; a State Highway; traffic to the University; trucks, almost all the time; curbs close to the street; and stop-and-start traffic.

A five-minute sampling of the noise environment was just about all that our noise monitor could take. Trucks were frequent, buses too. Peak levels reached up to 96 decibels for a sports car and a semi. When things quieted down, the noise was still hovering near 65 decibels, and most of the time, the decibel meter registered around 73. In the five minutes, the sound was over 78-80 for a total 2 minutes and 42 seconds—over half of the time.

Exposure to traffic noise seems to be the most aggravating of noise assaults on the individual. On this particular day, a short stint at Mission and Bay proved to be a stress-inducing experience and a valuable lesson in personal urban placement.

In the downtown area, Water and Front Streets registered a range of 56-78 decibels, with one minute, fifteen seconds over 64 decibels, in a five-minute sample. At the Water-Soquel mini-park, the traffic predominated ambient level ranged between 66 and 70 decibels, but only 23 seconds in five minutes were over 70 decibels. The major intersection in the Harvey West industrial area (Coral Street/Harvey West Blvd.) showed an ambient level of 56-58. This rises to nearly 62 decibels when the cement mixer is operating. Peak sound level reached 86 decibels with the passing of a motorcycle and in five minutes, two minutes, five seconds were over 60 db(A).

The following chart was compiled by the roving private ear with aid of a sound level meter. The samples are random and are presented for the purpose of thinking about common noise exposures in terms of decibels and not as annoyance. There should be an allowance for error of a decibel or two, but since all readings were made with the same instrument, the comparison of the varying levels should be legitimate.

## NOISE IN THE NEIGHBORHOODS

For planning purposes, the City has been divided into seventeen (17) Analysis Areas. Each Area has unique sound-producing characteristics. Following are capsule summaries of factors which contribute to neighborhood noise environments. Factors include land use, location of highways and major streets, and existing noise-sensitive uses such as schools, libraries, and hospitals.

Sound levels were measured over a five-minute span at various locations in each Analysis Area. These noise readings are included in the following pages and they

<i>Typical Noise Exposures</i>	<i>Decibels (A)</i>	<i>Distance</i>
Police car siren	102 (peak)	10'
Pneumatic pavement drill	98	10'
Volkswagen revving in parking lot	70-90 (range)	10'
Construction work at Yacht Harbor parking area	68-84 (range)	10-30'
most common:	72	--
1:00 in 5-minute sampling	over 74	--
Pacific Avenue Mall		
—Weekday afternoon	62-64	--
—Cooperhouse w/outdoor music	82	20'
Sidewalk noise from an average sized passing auto	75	10'
Waiting for the bus (Soquel Transit Center)		
—With buses idling across street	66-69	30'
—With buses immediately in front idling	79-80	10'
—Bus accelerating at start	86	10'
Riding the City Transit bus (rear position)		
—Idling	73-74	--
—Low speed	82-83	--
—Climbing Mission Street hill	88-90	--
—Average high gear driving	78-81	--
—In a 20-minute route, 6 min., 35 sec. of the time registered	over 80 (A)	--
Soquel-Water-Morrissey Park		
—11:15 AM, weekday	66-70	20'
—23 seconds in five minutes	over 70	20'
Yacht Harbor on a quiet morning	52-56	--
Main Library	39-55	--

give a general indication of decibel levels for neighborhood ambient noise (background condition). Additionally, indications of intruding noise in the five-minute sample are included, noting peak noise exposures and the amount of time during which the ambient level was exceeded.

Results from the City's 1974 newspaper noise questionnaire are also included in the neighborhood analysis. Excerpts of letters accompanying responses to the survey further illustrate community perception of the neighborhood noise situation.

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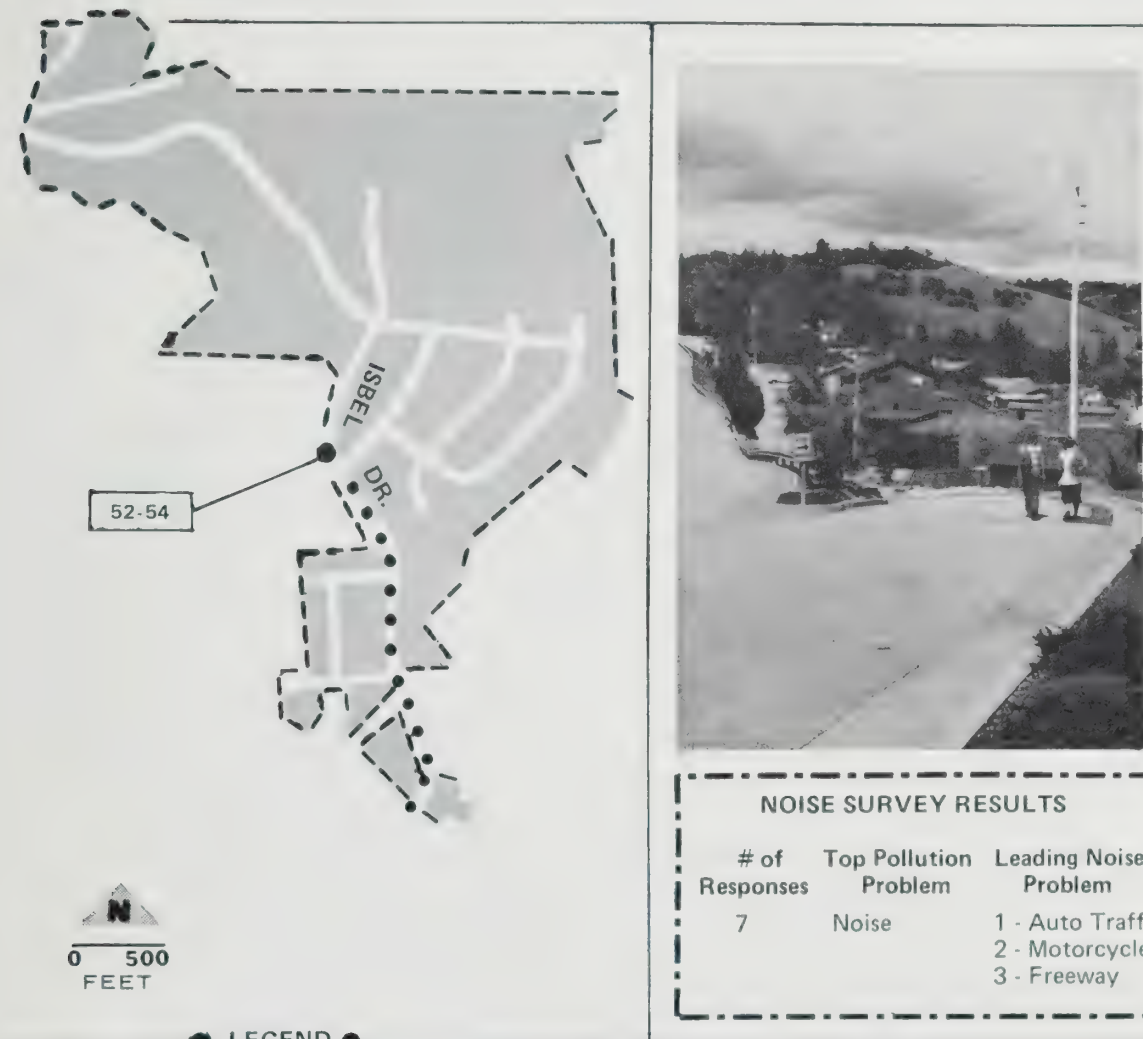
*Sources: City Noise Survey, 1974; Noise Contour Maps, State of California, Department of Transportation, 1974.*



# Analysis area

Noise is not a significant problem within this residential area. The major through street, Isbel Drive, serves primarily the residents within the area. Hilly, heavily wooded terrain helps diminish noise impacts from distant sources, although at some high spots, the vehicular noise from Highway 17 can be heard in the background.

On a typical day, the prevalent sounds would be the chirping of birds and perhaps distant freeway traffic. The recorded ambient level at Isbel and Calcita was approximately 52-54 decibels (db(A)).



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
7	Noise	1 - Auto Traffic 2 - Motorcycles 3 - Freeway

## LEGEND

- In October, 1974 a city wide noise survey was conducted by the Planning Department. Noise survey results for each analysis area appear in this box.
- Many citizens took the time to elaborate on the noise situation in their neighborhood when responding to the 1974 noise questionnaire. Excerpts from those responses appear in this box.
- City limits.
- Streets designated by the City to carry through traffic.
- Noise contours generated from auto, truck and motorcycle traffic. The number is the decibel level that is exceeded 10% of the time.
- Predicted noise contours in 1995 from auto, truck and motorcycle traffic. The number is the decibel level that is expected to be exceeded 10% of the time.
- Typical noise levels as determined by random noise readings in the summer of 1975.

carbonera estate

# Prospect Heights Analysis Area B

Noise impacts in this Analysis Area vary with proximity to Highway 1, which forms the southern boundary of Prospect Heights. For example, the ambient level near the freeway at Emeline and Lee Streets measured near 60 db(A), while in DeLaveaga Park the ambient level was near 45 db(A). The peak traffic generated sound levels at each location measured 81 db(A) and 65 db(A) respectively.

The land use here is predominantly single-family residential. The most heavily travelled streets are collectors serving local residents. Prospect Heights Elementary School is subject to minimum noise impact.

## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
20	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Trucks

*Motorcycles are by far the loudest and the most irritating and to boot completely unnecessary source of noise.*





**התאחדות**

Noise Survey respondents from this Area listed motorcycles and auto traffic in general as the two leading noise problems.



# of Responses	Top Pollution Problem	Leading Noise Problem
21	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Animals

Cars + motorcycles with  
LOUD engines racing  
down Market St.



# Analysis area

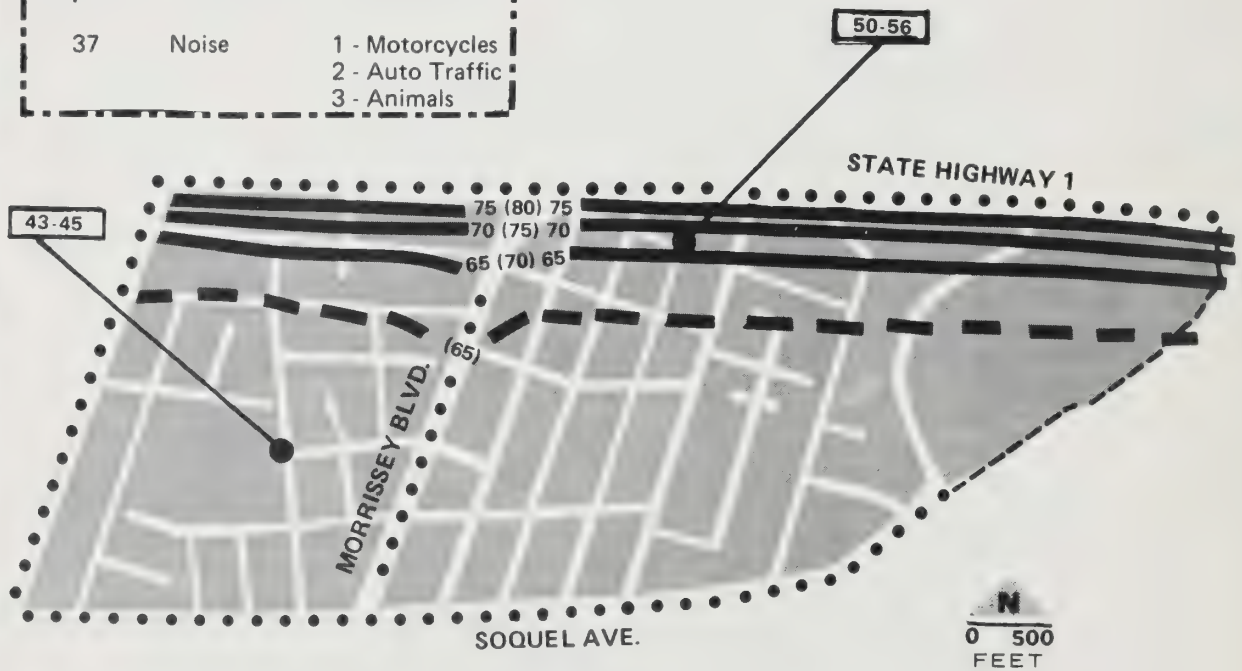
east of Branciforte

Sound levels in this area vary according to proximity to Highway 1 and the three arterial streets — Water, North Branciforte, and Morrissey. Morrissey and North Branciforte are more lightly travelled than Water Street. However, traffic noise affects more residents on Morrissey and North Branciforte.

The ambient level at Marnell and Roxas (near the freeway) registered over 50 db(A), as compared to an ambient reading of 43-45 at Branciforte Junior High School (Hammond and Poplar).

Responses to the Noise Survey from residents of this area indicated that motorcycles and vehicle noise are the major irritants.

NOISE SURVEY RESULTS		
# of Responses	Top Pollution Problem	Leading Noise Problem
37	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Animals



*the traffic on Morrissey Blvd is terrible. Not the amount of cars but the noise of the trucks and cars going at such great speeds Day and Night.*



# Analysis Area

## West of Seabright

This residential area is heavily interspersed with arterial roads, including Water Street, Ocean Street, Soquel Avenue, Broadway, Barson Street, and the San Lorenzo Boulevard-East Cliff Drive-Murray Street throughway. This may partially account for the fact that there were more Noise Survey responses (48) from this Area than any other Analysis Area.

Motorcycles, auto traffic, and animals were the leading noise problems. Ambient levels near the major arterial roads hovered around 60 and 63 db(A) during the day. Noise exposures for area residents increase during summer and warm weekends, because these roads are used by beach-destined visitors.



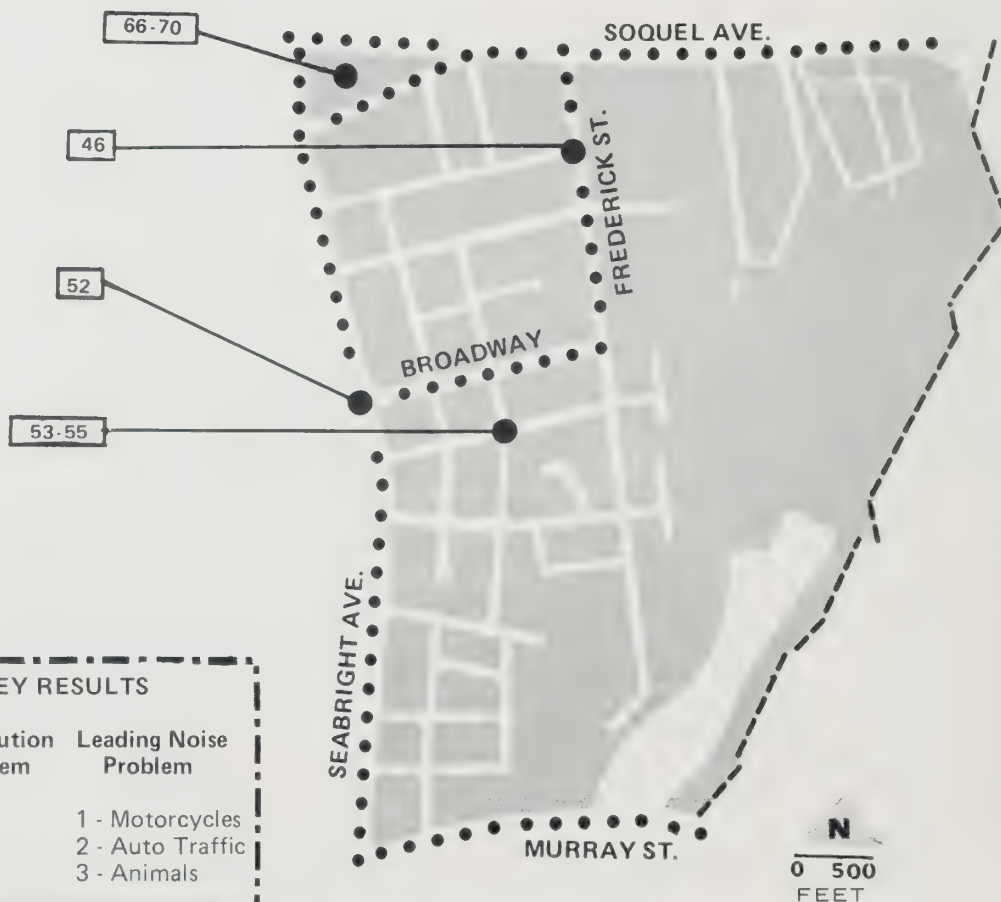
NOISE SURVEY RESULTS		
# of Responses	Top Pollution Problem	Leading Noise Problem
48	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Animals

# Analysis area east of seabright

This Analysis Area is bordered by three major traffic arteries — Soquel Avenue, Seabright Avenue, and Murray Street. Of these, Soquel Avenue sustains the highest traffic volume, approximately twice that of Seabright. However, commercial use dominates Soquel frontage and this helps keep the main infusion of traffic noise away from the residential areas.

Gault Elementary School is located on Seabright where sound checks indicated an ambient of 52 db(A), peaks of near 80 db(A), and common exposures of over 60 db(A) with normal passage of traffic.

The Community Hospital and Gault Street Library Branch are subject to somewhat lesser traffic noise exposure due to their location on lower traffic volume streets.



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
35	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Animals





# Analysis area

# Yacht Harbor

Residents of the Yacht Harbor area are subject to the weekend and seasonal fluctuations of harbor use which determine traffic volume and accompanying noise.

Murray Street is an arterial street which carries a good deal of traffic, but this noise is shielded from most of the residences. Most of the streets in this Area require low-speed driving which helps keep noise to a minimum.

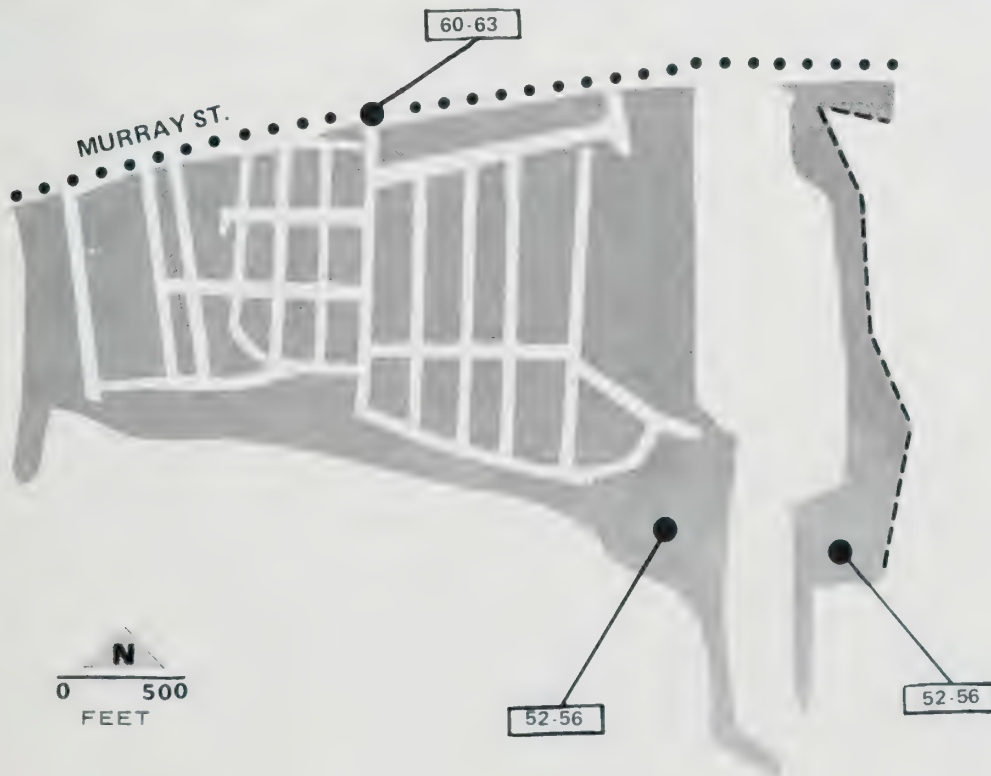
On the positive side, many inhabitants of this Area are recipients of one of the finer sounds of Santa Cruz, the perennial undulation of ocean surf.



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
18	Noise	1 - Motorcycles 2 - Trucks

*Murray & Eaton from 10 PM to 12 PM is a race track from 7th to Seabright.*



# Analysis area

The University is located in a forested setting away from the urban environment of the City. The expansive area, the rural nature of the setting, and the cluster/open space design of the colleges contribute to the overall quiet of the campus.

USE



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
2	Litter	1 - Animal Noise 2 - Auto Traffic 3 - Amplified Music



# Analysis area

# Westlake

This Area is primarily residential, punctuated by only two major arteries — High Street and Bay Drive. Much of this traffic is commuter traffic to and from the University, although Bay Drive is a city truck route. Some of the traffic-generated noise from Bay Drive is shielded from homes by irregular terrain. It is likely that traffic volumes will level out now that the University growth is to proceed at a slower pace. Also, without significant amounts of new construction on campus, there will be fewer truck trips.

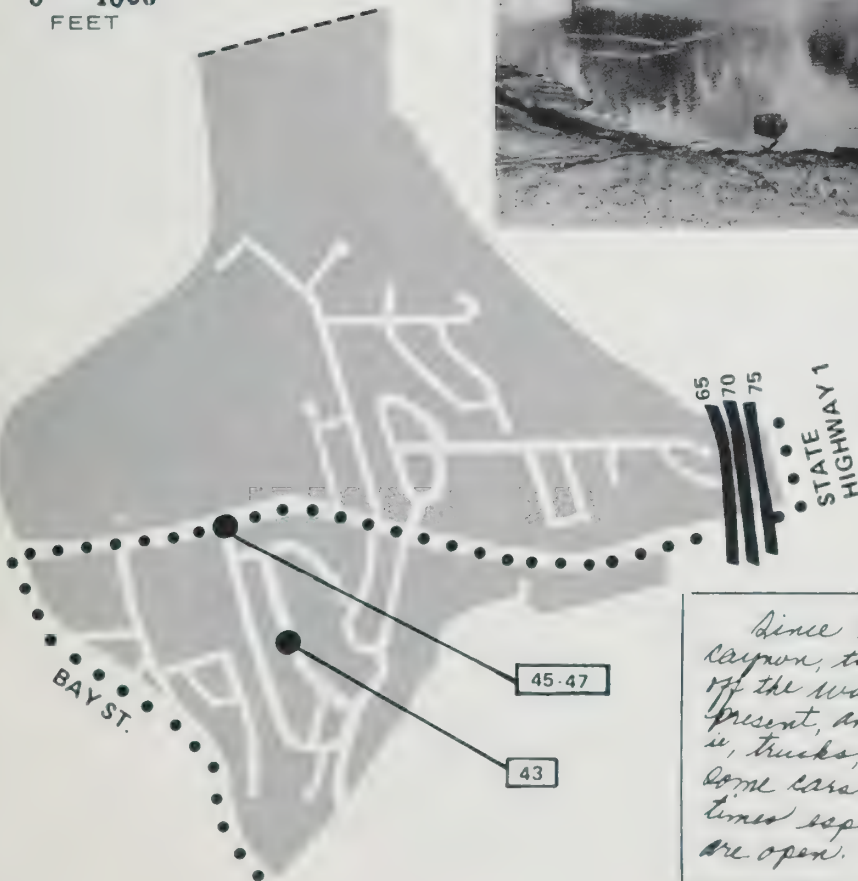
Ambient sound level at the intersection of Moore and High Streets registered near 47 db(A). Traffic produced jumped into the 60+ db(A) range, while the peak reading was produced by a school bus — 91 db(A).

Majors Street, at the lake, showed an ambient level of 43 with the prevalent sounds of birds and ducks being interrupted only by a distant train and the occasional passing of an auto — peak 64 db(A).

Westlake School's hill-top location helps eliminate traffic noise interruptions.



N  
0 1000  
FEET



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
30	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Trucks

Since Bay Street is located in a canyon, the noise produced by vehicles off the walls is EAR SHATTERING, constantly present, and certain types of vehicles i.e. trucks, Vch, buses, motorcycles, and some cars make it intolerable at times especially if windows or doors are open.

# Analysis Area

## river street

This Analysis Area is predominated by industrial use at Harvey West Park. Much of the industry is light and, therefore, noise problems are not severe. Some of the residents of the area may be subjected to truck traffic, although very few residents of this Analysis Area responded to the Noise Survey.

A sound reading at Coral and Harvey West Boulevard produced an ambient level of 56-58 db(A). This rose to 62 db(A) when a nearby industrial cement plant operated its mixer.



### NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
2	Air, Noise	(No consensus)

N  
0 500  
FEET





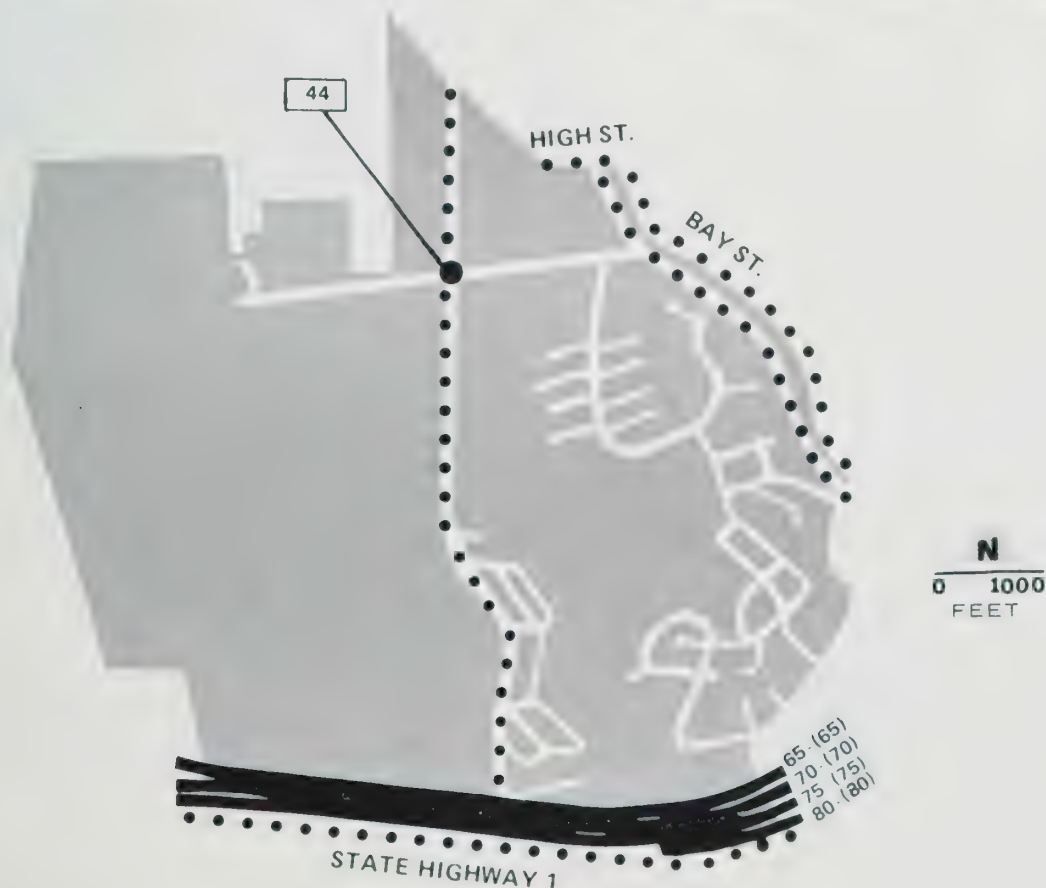
# Analysis areak

Presently, the Area is not subjected to high noise impact with the possible exception of the areas directly adjacent to Highway 1/Mission Street. The arterial roads are Bay Street and Western Drive. Prevalent sounds at Western and Meder emanate from birds and occasional traffic. An ambient level of 44 db(A) was exceeded only 14 seconds during a five-minute sample.

The existence of large parcels of vacant land has encouraged the use of dirt-oriented motorcycles which have induced some noise complaints from area residents.



NOISE SURVEY RESULTS		
# of Responses	Top Pollution Problem	Leading Noise Problem
2	Noise	1 - Amplified Music 2 - Auto Traffic 3 - Motorcycles



For west ride

# Analysis area

## Mission corridor

The Mission Street Corridor is subjected to the significant noise impact which accompanies the high-volume traffic along Mission. The intersection of Mission and Bay is one of the noisiest in town with sound levels ranging constantly between 65-87 db(A) during day-light use. Peak readings of up to 95 db(A) from trucks and loud cars were experienced during noise samples.

The ambient levels away from Mission Street are much lower. For example, a reading at Storey and Escalona showed 47 db(A) peaking to 75 db(A) with vehicle passage.

Mission Hill Junior High School, located between Mission and King Streets, is subject to a somewhat higher chance of traffic noise disruption than most other schools.



### NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
29	Noise	1 - Motorcycles 2 - Auto Traffic 3 - Animal Noise



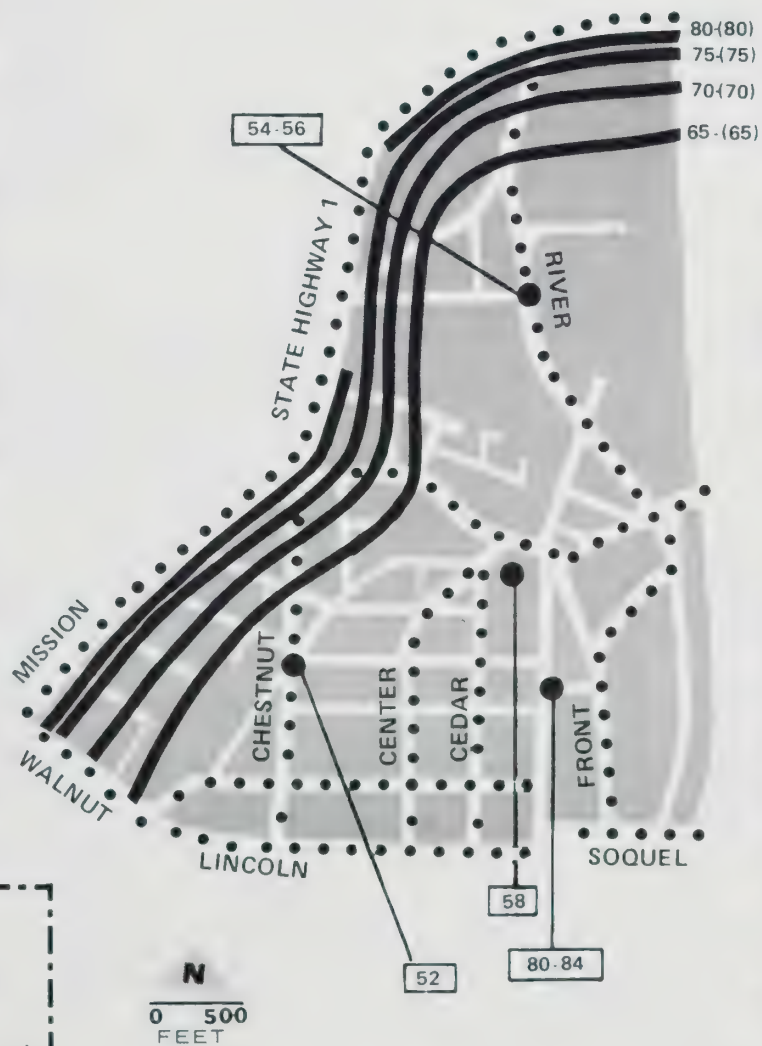


# Analysis Area

This Analysis Area holds a great diversity of uses — mixing residential, commercial and office functions. Downtown streets, comprising the vital center of the City, are nearly all considered either arterial or collector streets. Although the volume of traffic is heavy, much of it is low-speed, and trucks are restricted from residential areas. The sounds of Santa Cruz are most noticeable here because so many people move through downtown on bicycle or foot. A major noise impact — the train — moves daily along Chestnut Street (although few complaints were received about this).

There was a high rate of response to the Noise Survey from this Area. Animal noise, automobile traffic, and amplified music were cited most frequently as the major noise sources.

Ambient levels along the Mall, at River Street and Mora, and at Chestnut and Rincon, were all in the 53-58 db(A) range. Perhaps the major noise-prone area is at the Mission Street/Highway 1 interchange.



## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
42	Noise	1 - Amplified Music 2 - Animal Noise 3 - Auto Traffic

# of Lincoln

downtown north

# Analysis area

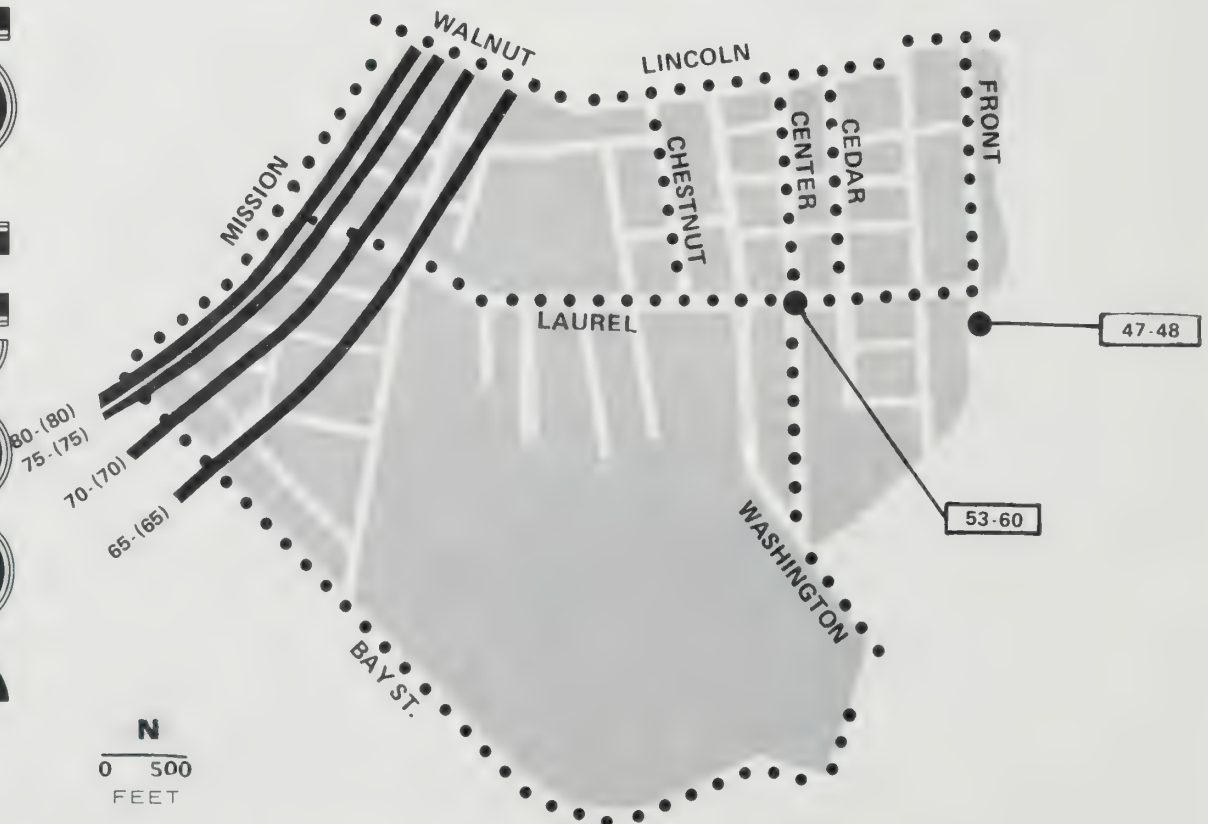
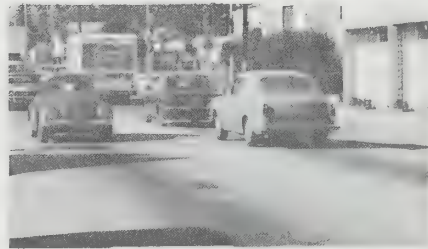
This Analysis Area also mixes various community uses although residential use tends to be more widespread here than in Area "M". The high downtown volume of traffic is conveyed through numerous arterial and collector streets. Traffic along Mission, Laurel, and Front Streets appears to have the most noise impact.

Respondents from this area ranked trucks, auto traffic, and motorcycles as their chief noise annoyance. Readings at Laurel and Center, and at Pacific and Front, showed ambients of near 53 db(A). A more prevalent traffic-induced range was over the 60 db(A) mark. Peaks hit 85-89 db(A) with trucks passing. Noise from the railroad yards sometimes caused annoyance.

Santa Cruz High School, located on Walnut at California, appears to be adequately shielded from the main sources of noise.

## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
40	Noise	1 - Auto Traffic 2 - Trucks 3 - Motorcycles



# downtown

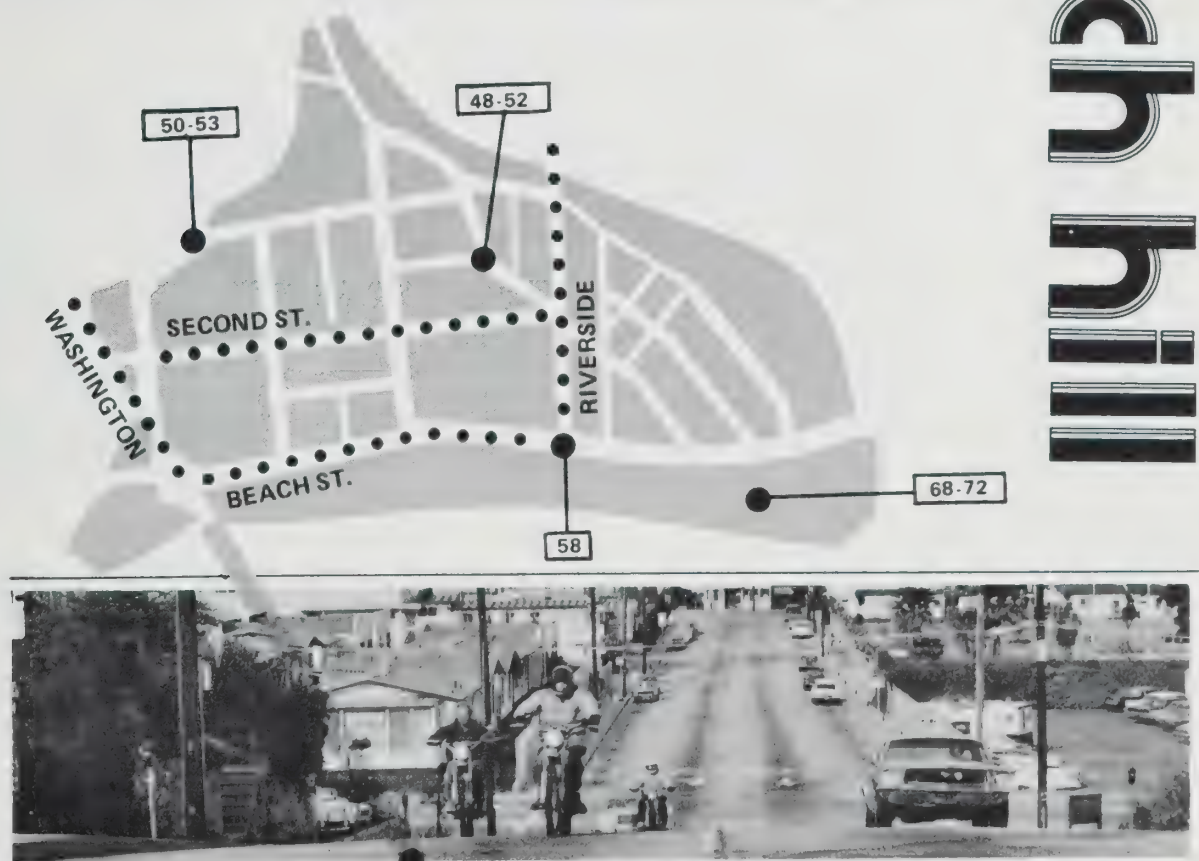


# Analysts area beach hill

The Beach Hill Area has a mixed-use character with residential and tourist-oriented commercial land uses most prevalent. The noise impact is highly subject to seasonal fluctuations; heaviest use during summer months. Beach Street, Second Street, and Riverside Avenue are traffic arteries serving this Area.

One of the most troublesome aspects for residents of Beach Hill is the fact that much of the tourist-generated traffic occurs in the evening hours, when traffic noise is more potentially disruptive to home life. Also, the steep inclines of the streets force motorists to use lower gears which produce significantly greater engine whine. Compounding the problem, vehicles modified for extra loudness are often popular with beach area tourists.

To some degree, the automotive annoyances are balanced out by the calming sounds of the surf and the fact that during the winter months, the more limited use of the beaches brings greater quietness.



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## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
25	Noise	1 - Auto Traffic 2 - Motorcycles 3 - Garbage Trucks

*I live near Beach Street. What annoys me most are the constant drag racing of cars in the day time as well as the night. But the night times in the summer months are really un called for. It goes on at times, till three or four in the morning. Some nuts you care nothing for other people. The racing up and down the streets can be heard for blocks around.*

# Analysts are ap natural bridges

The greatest concentration of noise impacts in this area occurs along the Mission Street/ Highway 1 corridor. Much of the land use here consists of commercial and industrial firms, indicating a lesser impact on residential use than in other areas of the City.

Most residential uses are not subject to high amounts of noise; ambient sound levels registered in the 41-45 db(A) range. The Natural Bridges Elementary School is located away from potentially disruptive noise and the major arterial road — Delaware Avenue — is not heavily used.

## NOISE SURVEY RESULTS

# of Responses	Top Pollution Problem	Leading Noise Problem
22	Noise	1 - Auto Traffic 2 - Motorcycles 3 - Garbage Trucks

The noise I wish to complain about is made by cars and motorcycles racing, slamming on brakes, screaming their tires, all this in the middle of the night. Right after night. The next day their tracks are there, long black tire marks, black circles made when they slam on their brakes and make tight turns. I wouldn't think of taking my car out on Delaware after dark. It would be very dangerous to meet these crazy drivers.

It is shameful to see tires and gasoline wasted in this irresponsible way. And besides, many a night's sleep has been lost because of this very frequent disturbance.





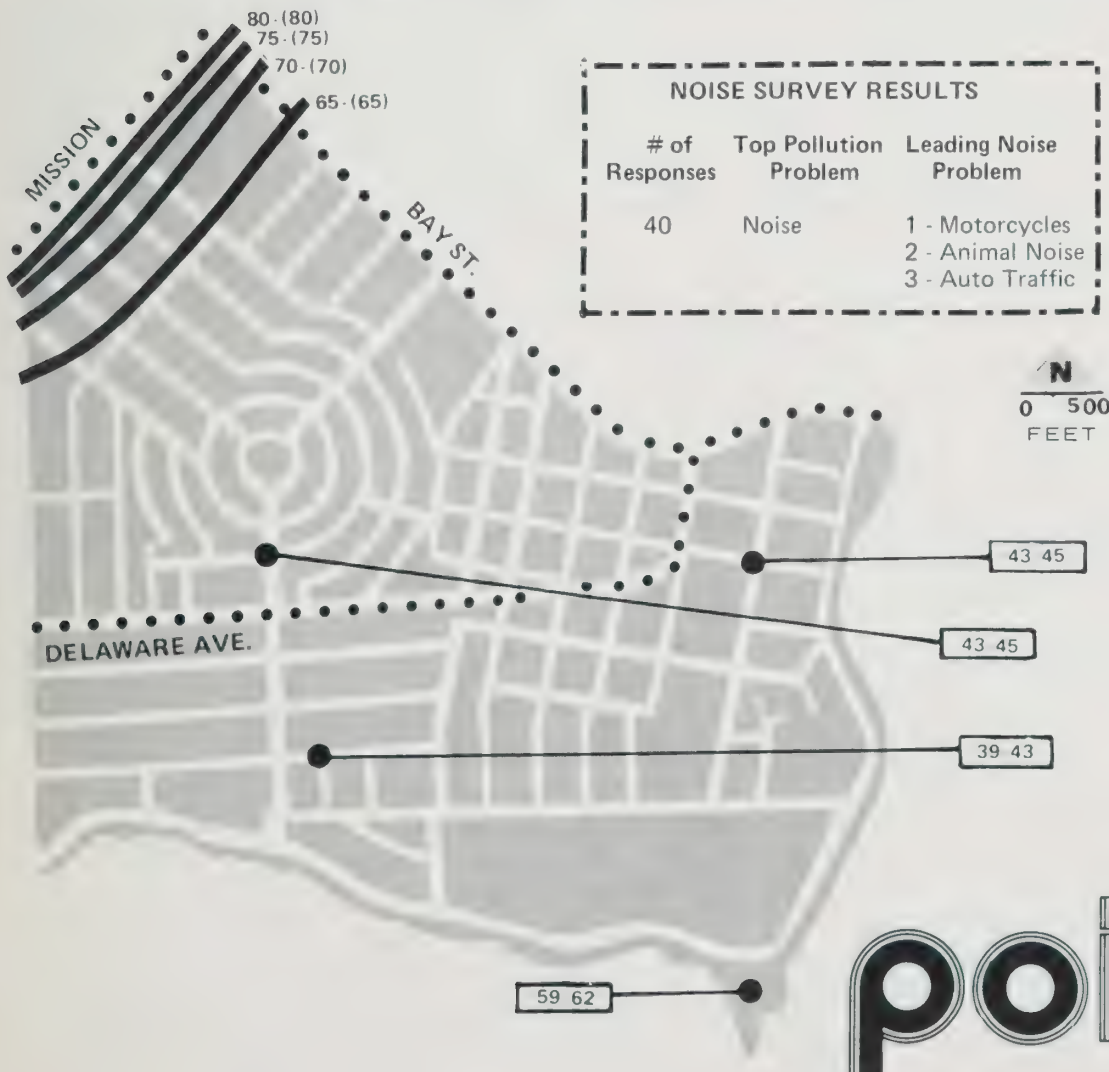
# Analysis Area

As with all Analysis Areas bounded by Mission Street, the most persistent noise impact emanates from vehicle traffic. Delaware Avenue, Bay Street, and West Cliff Drive are also heavily travelled thoroughways.

Generally, ambient sound levels are in the low 40 db(A) range, and many Circles/Lighthouse Point Area residents are availed to the pleasant sound of the Pacific surf. Motorcycles were listed as the leading noise irritant in the questionnaire. This is most likely due to the use of vacant land near Lighthouse Point for off-street motorcycling.

The location of Bayview Elementary School at Mission and Bay would indicate that there is a greater likelihood of traffic noise disruption there than at most schools. The Garfield Park Library Branch is not subjected to many noise problems.

We have a problem here in regards to excessive noise with motor scooters and motor cycles. Some show no liscense. (MOTOR DRIVEN CYCLES PROHIBITED) This sign was placed at end of Bethany Curve, and on Delaware St. (where Bethany intersects) The boys have torn down these signs and continue to use this area to ride motor driven scooters and motor cycles. Some cycles seem to have no liscense, nor mufflers. They make excessive noise by accelerating the motors. The open ground at end of Bethany Curve is the area most often used. The vehicles are objectionable because of the noise, and also, at times of far too much speed.







# NOISE AND LOCAL GOVERNMENT — A POLICY STATEMENT

Local government alone will not quiet city noise. The scope of the noise problem extends far beyond the range of governmental remedy. Law enforcement and planning, however, can minimize the problem through the adoption of community-desired codes and ordinances, and through the compatible juxtaposition of future land uses within the City. It is within these policy areas that local government can make its contribution toward attaining a desirable noise level in the community.

## EXISTING NOISE-CONTROL POLICY

Noise control in Santa Cruz is based upon a general principal that a healthy and pleasing sound level should be maintained throughout the City. This basic principal is reflected in the Santa Cruz Municipal Code in Title 9: Peace, Safety and Morals (Chapters 9.36, 9.40 & 9.54), Title 18: Buildings and construction (Chapter 18.04), and Title 24: Zoning (Chapter 24.36).

- Chapter 9.36 — Noise: Chapter 9.36 imposes a curfew on local noise between the hours of 10 PM and 8 AM of any day. It also prohibits unnecessary noise annoying to persons of ordinary sensitiveness at any time of day or night.
- Chapter 9.40 — Sound Amplifiers: Chapter 9.40 prohibits the use of sound-amplifying devices in such a manner as to distract or annoy persons of ordinary sensitivity to sound.
- Chapter 9.54 — Motorcycles: Chapter 9.54 regulates the use of motorcycles on unimproved private property and public parks. In so doing it requires

that motorcycles be equipped with an adequate muffler in constant operation and properly maintained so as to meet the requirements of the motor vehicle noise limits.

- Chapter 18.04 — Building Code: The City's Building Code requires noise insulation in all residential structures as per Chapter 35 of the Uniform Building Code. The State Department of Housing & Community Development insulation requirements, adopted in April 1975, for new residential buildings are designed for energy conservation. However, they too effect a reduction in noise transmission.
- Chapter 24.36 — Performance Standards: Chapter 24.36 contains performance standards applicable to all uses in the City. The purpose for performance standards is to factually and objectively measure potential nuisance factors as well as to protect the community from dangerous and objectionable elements. Among the dangerous and objectionable elements regulated in this Chapter is noise. According to the requirements of the Chapter, noise levels must be measured with a sound level meter and associated octave band analyzer conforming to standards prescribed by the American Standards Association. The standards are also used as a basis for attaching conditions to use permits for potentially loud uses.

## PROPOSED NOISE-CONTROL POLICY

Looking to the future, two primary goals act as

guides for City noise policy and its implementation. They are:

1. Preserve the *Sounds* of Santa Cruz—Change and growth should not eliminate the sounds of our environment. We should strive to blend the old with the new; not obliterate the old with the new.

2. Put Noise in its Place in Santa Cruz—There will always be noise. We should not set the unrealistic goal of eliminating noise in Santa Cruz; we should, however, intend to minimize noise and not allow it to increase or to spread beyond the areas and times in which it can reasonably be expected to occur.

With the above goals in mind, The City of Santa Cruz sets forth the following policies; to be implemented by the City of Santa Cruz and to be reflected in the planning and development program, as well as the noise enforcement efforts of the City.

#### Land Use Policies

- Land use adjacent to freeways and other heavily travelled roads should be considered in light of its degree of compatibility with a high ambient noise level.
- Land use adjacent to the Boardwalk, the Wharf, the Mall, playgrounds, and schools should be considered in light of its degree of compatibility with potentially high ambient noise levels and occasional high intruding noise levels.
- Automobile and truck traffic circulation planning should reflect the least possible disruption of residential neighborhoods by providing for through traffic on a minimum number of residential streets.
- Consideration should be given to noise reduction techniques for residential land use adjacent to, or in close proximity to, State Routes 1, 9 and 17, based on the following criteria;
  - a) The proposed residential development in predominately developed areas, new residential structures within 100 feet of the State route, should be analyzed for noise-reducing mitigation features such as orientation of outdoor living areas away from the traffic; sound barriers between traffic and outdoor living areas, and proper sound insulation for the structure itself.
  - b) For proposed residential development in predominately undeveloped open areas, new residential construction within 1000 feet of the State route should be analyzed for noise-reducing mitigation features such as earth berms, walls or other noise barriers, as well as those mentioned above.
  - c) For existing residential development within freeway noise-affected areas, the City should encourage the implementation of the State Department of Transportation policy on reducing traffic-generated freeway noise.

#### Noise Reduction Enforcement Policies

- Officially endorse state legislation designed to reduce noise emanating from motor vehicles.
- Officially adopt all Uniform Building Code noise reduction changes as they are developed.
- Review on a periodic basis, and revise when necessary, existing City noise performance standards based upon City needs and City equipment and personnel capabilities.
- Encourage a “good neighbor” policy that would require a citizen to approach his “neighbor” before being eligible to register a noise complaint about his neighbor. This policy could be implemented through the efforts of the Police Department and the Public Information Officer.

#### COST ANALYSIS

The policies contained herein have potential to increase City operating costs and also have potential to add to land preparation and construction costs for development near identifiable noise generators.

Relative to City operating cost, little, if any, increases should result from the review and adoption of revised building codes and from noise considerations being made throughout the planning process. Both noise reduction efforts should be easily assimilated into existing City functions. In regard to the revision of performance standards, they too may be easily handled by existing City functions; however, should it be deemed desirable to substantially increase noise enforcement efforts, expenditures would need to be made for both noise monitoring equipment and enforcement personnel.

With regard to the direct costs these policies represent to the public, new residential development in the vicinity of heavily travelled roads may cost more due to noise mitigating conditions being placed on development proposals. Earth berms, walls, and other noise barriers for the purpose of protecting outdoor living areas from traffic noise will increase proposed development budgets. Such increases will be reflected in the cost of housing; however, they should not be substantial.

Noise insulation costs for buildings will not rise as a result of this Element as no additional measures beyond the requirements of the Uniform Building Code and the State Insulation Code are deemed necessary.

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*Sources: Santa Cruz Municipal Code; Santa Cruz Zoning Ordinance; Uniform Building Code, International Conference of Building Officials, 1973; California Department of Transportation, Memorandum to all District Directors of Transportation, Re: Policy on Traffic Generated Freeway Noise.*



## ENVIRONMENTAL REVIEW — NEGATIVE DECLARATION

The Noise Element is a statement of policy indicating the local jurisdictions' general intentions regarding noise and noise sources in the community. The policy has been developed primarily in response to a community questionnaire soliciting the identification of noise problems throughout the community, and in response to State-generated State highway noise data. The policy reflects a need and a plan for reducing noise levels; thereby, reducing its adverse effects. For this reason, this Element represents no significant adverse impact to the community of Santa Cruz. Further evidence to substantiate this declaration of no negative impact is discussed in conjunction with each policy area of the Noise Element.

1. **General Plan** — Policies designed to mitigate noise problems via longrange planning (General Plan) deal primarily with encouraging compatible land use near noticeably noisy areas in the City; primarily along heavily-travelled roads and near heavily used outdoor-oriented activities. Such policy may result in an alteration of localized land use patterns. Such change, however, would take place within the existing urban framework and should not affect the natural environment. The consideration and implementation of such policy would enhance the quality of life in Santa Cruz.

2. **Development Planning** — Policies designed to consider noise impact on a project-by-project basis include construction of noise barriers and reorientation of proposed buildings to mitigate noise. Whereas, such policies have an insignificant economic impact (adding to the cost of development), they are designed to mitigate the annoyance and hazard of noise; thereby, preventing or reducing significant adverse impact resulting from noise.

3. **New Ordinances** — The review, revision, and development of noise ordinance are designed to establish effective and implementable noise regulations. Establishing effective performance standards would act to maintain the relatively low noise levels in the City's industrial areas.

4. **Encourage State and Federal Agencies to Develop and Implement Noise Policy** — No adverse impacts are associated with such policy.

5. **Good Neighbor Policy** — The policy to encourage people to approach their neighbor prior to approaching the police relative to a noise complaint represents no physical impact to the environment but does represent a potentially beneficial social impact.







U.C. BERKELEY LIBRARIES



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